

CLAIMS

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- 1- Cross-linked copolymers based on non cross-linked polycarboxylic copolymers and a cross-linking agent comprising at least two amine functions,
- each non cross-linked polycarboxylic copolymer comprising at least one non cross-linked polysaccharide linked by a covalent bond to at least one other non saccharidic non cross-linked polymer, and
- at least one of the non saccharidic polysaccharides and polymers, constituting the same non cross-linked copolymer, is polycarboxylic.
- 2- Copolymers according to claim 1, characterized in that the polysaccharide is non polycarboxylic.
- 3- Copolymers according to one of claims 1 to 2, characterized in that the non polycarboxylic polysaccharide is chosen from agarose, agarpectin, amylose, amylopectin, arabinogalactan, carrageenans, cellulose or methylcellulose, chitosan, dextran, keratan sulphate, fucans and fucoidans, tragacanth, arabic, locust bean and guar gums or pullulan.
- 4- Copolymers according to claim 1, characterized in that the polysaccharide is polycarboxylic.
- 5- Copolymers according to one of claims 1 or 4, characterized in that the polycarboxylic polysaccharide is chosen from the glycosaminoglycanes, pectinic or alginic acid.
- 6- Copolymers according to one of claims 1, 4 or 5, characterized in that the polycarboxylic polysaccharide is a glycosaminoglycane chosen from hyaluronic acid, chondroitin sulphate, heparin, dermatan sulphate and heparan sulphate.
- 7- Copolymers according to claim 1 to 6, characterized in that the non saccharidic polymer is non polycarboxylic.

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8- Copolymers according to one of claims 1 to 7, characterized in that the non polycarboxylic non saccharidic polymer is chosen from poly(vinyl acetate), poly(vinyl alcohol), poly(acrylic esters), poly(methacrylic esters), poly(methacrylamides) and poly(acrylamides).

5 9- Copolymers according to any one of claims 1 to 6, characterized in that the non saccharidic polymer is polycarboxylic.

10- Copolymers according to any one of claims 1 to 6 or 9, characterized in that the non saccharidic polymer is a polycarboxylic acrylic polymer.

10 11- Copolymers according to claim 10, characterized in that the polycarboxylic acrylic polymer is poly(acrylic acid) or poly(methacrylic acid).

12- Copolymers according to any one of claims 1 to 11, in which the cross-linking agent is chosen from diamines, natural or synthetic amino acids or polyamines, and preferentially diamines.

13- Copolymers according to claim 12 in which the cross-linking agent is a diamine.

15 14- Copolymers according to one of claims 1 to 13, characterized in that the polysaccharide is degradable by the microbial flora of the colon.

15- Copolymers according to claim 14, characterized in that the polysaccharide is chosen from chondroitin sulphate, hyaluronic acid, pectinic acid, heparin, dextran, chitosan, amylose, pectin, alginates or xanthan.

20 16- Copolymers according to any one of claims 14 to 15, characterized in that the polysaccharide is chondroitin sulphate, the other said non saccharidic polymer is poly(acrylic acid) or poly(methacrylic acid), and the cross-linking agent is hexanediamine.

25 17- Process for the preparation of cross-linked copolymers according to any one of claims 1 to 16, characterized in that said non cross-linked polycarboxylic copolymers are reacted, in an aqueous medium, in the presence of an activator and of said cross-linking agent.

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18- Process according to claim 17, in which the activator is chosen from carbodiimides, quinoline derivatives and mixed anhydrides.

19- Process for the preparation of non cross-linked copolymers according to claim 1, characterized in that the monomer of the non saccharidic polymer is grafted onto the polysaccharide in an aqueous medium, under an inert atmosphere and in the presence of a catalyst, which monomer will then polymerise under these reaction conditions.

20- Pharmaceutical composition containing at least one active ingredient and, as an inert support or excipient, at least one cross-linked copolymer according to one of claims 1 to 13.

21- Pharmaceutical composition containing at least one active ingredient and, as an inert support or excipient, at least one copolymer according to one of claims 14 to 16.

22- Use of a pharmaceutical composition according to one of claims 20 to 21 for sustained release.

23- Use of a pharmaceutical composition according to one of claims 20 to 21 as a bioadhesive pharmaceutical system.

24- Use of a pharmaceutical composition according to claim 21 for the specific release of the active ingredient at the level of the colon.

25- Use according to claim 24 to convey the active ingredient intended for the treatment of diseases of the colon.

26- Use according to claim 24 to convey the active ingredient which is absorbed at the level of the colon.

27- Use according to claim 24 to convey the active ingredient which is degraded in the upper parts of the digestive tract.

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